

AMENDMENTS TO THE CLAIMS

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-120 (Cancelled).

Claim 121. (New) An apparatus for mounting coupled with a power line carrying a high AC line voltage, the apparatus comprising:

a conductive body having a body capacitance;

a power supply comprising at least two input terminals; a first of said at least two input terminals coupled to said conductive body and a second of said at least two input terminals operative to be coupled to said power line;

electronic circuitry coupled to said power supply;

wherein said power supply is operative to convert power flow between said conductive body and said power line into a supply of power at a voltage substantially lower than said high AC line voltage for operation of said electronic circuitry.

Claim 122. (New) The apparatus of claim 121, wherein said electronic circuitry comprises:

a sensor operative to sense at least one parameter, said at least one parameter comprises at least one of ambient temperature, internal temperature, temperature of said power line, strain, humidity, elevation, position, ambient light level, air quality, vibration, acceleration, sound level or atmospheric pressure.

Claim 123. (New) The apparatus of claim 122, wherein said electronic circuitry further comprises a wireless radio frequency transmitter operative to transmit said at least one parameter to a remote device which is not physically coupled to said apparatus.

Claim 124. (New) The apparatus of claim 123, wherein said electronic circuitry further comprises a radio frequency positioning receiver operative to receive position information and determine the position of said apparatus.

Claim 125. (New) The apparatus of claim 123, wherein:
said electronic circuitry further comprises a processor operative to secure data incorporating said at least one parameter; and
said wireless transmitter is operative to transmit said data.

Claim 126. (New) The apparatus of claim 121, wherein said electronic circuitry comprises a current sensor operative to sense current flow in said power line.

Claim 127. (New) The apparatus of claim 126, wherein said current sensor comprises at least one of an active current transformer, a Hall effect sensor, a Rogowski coil, a magnetic core current transformer and an optical current transducer.

Claim 128. (New) The apparatus of claim 126, further comprising:
at least one analog to digital converter coupled to said current sensor;
a processor coupled to said at least one analog to digital converter and operative to receive digital samples representative of said current flow in said power line from said analog to digital converter; and
a wireless transmitter coupled to said processor and operative to transmit said digital samples to a remote device which is not physically coupled to said apparatus.

Claim 129. (New) The apparatus of claim 128, further comprising:
a time synchronization receiver coupled to said processor; and
wherein said processor is operative to associate at least one timestamp from said time synchronization receiver with said digital samples.

Claim 130. (New) The apparatus of claim 121, wherein said electronic circuitry comprises a voltage sensor operative to sense voltage on said power line.

a processor operative to control the coupling of said bank of parallel capacitors and calculate the voltage on said power line using a plurality of said voltage levels when said second capacitance is switched to a plurality of values.

Claim 137. (New) The apparatus of claim 136, further comprising:

a conductive partition operative to prevent electric fields generated within said apparatus from affecting the voltage on said metallic plate and separate said apparatus into at least a first and second chamber, said first chamber housing at least said metallic plate and said second chamber housing at least a portion of said electronic circuitry; and

a dielectric cover formed at an outside end of said second chamber and operative to protect said metallic plate from the environment.

Claim 138. (New) The apparatus of claim 131, wherein said external reference comprises ground.

Claim 139. (New) The apparatus of claim 131, wherein said external reference comprises a second power line.

Claim 140. (New) The apparatus of claim 130, wherein said electronic circuitry comprises

at least one analog to digital converter coupled to said voltage sensor and said current sensor; and

a processor coupled to said at least one analog to digital converter and operative to receive digital samples representative of said current flow in said power line and said voltage on said power line from said analog to digital converter.

Claim 141. (New) The apparatus of claim 140, wherein said processor is operative to produce power flow data indicative of power flow in said power line using said digital samples.

Claim 142. (New) The apparatus of claim 121, wherein said electronic circuitry comprises at least one light source and at least one processor operative to control the lighting of said light source.

Claim 143. (New) The apparatus of claim 141, wherein said electronic circuitry further comprises a light sensor operative to sense ambient lighting conditions in the vicinity of said apparatus.

Claim 144. (New) The apparatus of claim 143, wherein said processor is coupled to said light sensor and said light source; said processor operative to illuminate said light source when said light sensor indicates said ambient lighting conditions are below a threshold.

Claim 145. (New) The apparatus of claim 121, further comprising an energy storage device coupled to said power supply and operative to supply power to said electronic circuitry when a condition exists such that said electronic circuitry demands more power than said power supply can produce.

Claim 146. (New) The apparatus of 145, wherein said condition is the illumination of said light source and/or failure of said high AC line voltage.

Claim 147. (New) The apparatus of claim 140, wherein said processor controls the application of charge to said energy storage device.

Claim 148. (New) The apparatus of claim 121, wherein said power supply comprises a transformer having at least a primary and a secondary winding, wherein said primary winding has a greater number of turns than said secondary winding.

Claim 149. (New) The apparatus of claim 121, wherein said power supply comprises:
a capacitor;
a rectification circuit coupled to said capacitor and operative to allow said capacitor to charge to a DC voltage from said power flow;
a controller operative to prevent and allow the flow of current through said primary winding from said capacitor;

a filter circuit coupled to said secondary winding and operative to produce said voltage substantially lower than said high AC line voltage; and

a feedback circuit coupled to said filter circuit and said controller wherein said controller uses the output of said feedback circuit to modulate said prevention and allowance of current flow in order to regulate said voltage substantially lower than said high AC line voltage.

Claim 150. (New) The apparatus of claim 121, wherein said electronic circuitry further comprises an electric motor operative to propel said apparatus along said power line.

Claim 151. (New) The apparatus of claim 121, wherein said electronic circuitry comprises at least one of a radar transmitter, fiber optic transmitter, a power line carrier transceiver, a display, a mesh networking transceiver, a sound emitting device, a video surveillance device, an audio surveillance device, a radio frequency repeater, an information sign and an advertising sign.

Claim 152. (New) The apparatus of claim 121, wherein said electronic circuitry comprises time synchronization reception circuitry operative to provide an indication of time to said processor; said processor operative to control said lighting based on said indication of time.

Claim 153. (New) The apparatus of claim 148, wherein said power supply comprises:
a rectification circuit coupled across said secondary winding;
a capacitor coupled to the output of said rectification circuit and operative to produce a DC voltage substantially lower than said high AC line voltage;
a regulator coupled to said capacitor and operative to regulate said DC voltage substantially lower than said high AC line voltage; and
wherein said primary winding is coupled in series between said conductive body and said power line.

Claim 154. (New) A method of powering an apparatus mountable coupled with a power line carrying a high AC line voltage, the method comprising:

mounting said apparatus such that a current flow occurs between said power line and the body capacitance of a conductive portion of said apparatus;

converting said current flow into a supply of power at a voltage substantially lower than said high AC line voltage; and

providing said supply of power to electronic circuitry coupled to said apparatus.

Claim 155. (New) The method of claim 154, wherein said high AC line voltage is greater than ten thousand volts and wherein said electronic circuitry comprises at least one of a voltage sensor and a current sensor.

Claim 156. (New) An apparatus for mounting coupled with a power line carrying a high AC line voltage, the apparatus comprising:

a conductive body having a body capacitance;

first means coupled to said conductive body and operative to be coupled to said power line for converting current flow between said power line and said conductive body to a supply of power at a voltage substantially lower than said high AC line voltage;

second means coupled to said supply of power for performing an electronic function.

Claim 157. (New) The apparatus of claim 156, wherein:

said second means comprises means for monitoring at least one of said high AC line voltage and current flow in said power line;

said voltage substantially lower than said high AC line voltage is less than one hundred volts; and

said high AC line voltage is greater than ten thousand volts.

Claim 131. (New) The apparatus of claim 130, wherein the voltage sensor comprises:
a metallic plate operative to form a first capacitance with an external reference;
a second capacitance coupled between said metallic plate and a system reference; and
detection circuitry operative to detect the voltage level on said metallic plate.

Claim 132. (New) The apparatus of claim 131, wherein said detection circuitry comprises:

- an amplifier operative to buffer said voltage level; and
- an analog to digital converter operative to generate a digital representation of said voltage level.

Claim 133. (New) The apparatus of claim 131, further comprising a high value resistor coupled between said metallic plate and a DC voltage rail and operative to maintain said metallic plate at a fixed DC voltage with respect to said system reference.

Claim 134. (New) The apparatus of claim 133, further comprising a surge arrestor coupled to said metallic plate.

Claim 135. (New) The apparatus of claim 131, further comprising:

- an electric conductor extending from said metallic plate to said second capacitance; and

- an insulator surrounding at least a portion of said electric conductor, supporting said metallic plate and preventing electric conductivity between said metallic plate and said conductive body.

Claim 136. (New) The apparatus of any of claim 131, wherein said second capacitance comprises:

- a bank of parallel capacitors, each of said capacitors operative to be dynamically electrically coupled and decoupled between said metallic plate and said system reference in order to form a variable capacitive divider; and